

Claims

[1] A carbonizing apparatus comprising:

5 a carbonizing furnace having a feeding portion for a processing target material, a takeout portion for a carbonized material, a blowout portion for combustion air and an exhausting portion for combustion exhaust gas;

10 a stirring device capable of stirring the processing target material inside the carbonizing furnace;

15 a blowout amount of the combustion air from the blowout portion being adjustable;

20 the apparatus being operable to carbonize the processing target material fed from the feeding portion, with stirring, spontaneously combusting and moving the material while moving this material toward the takeout portion and subsequently to take out the resultant carbonized material from the takeout portion;

25 wherein said carbonizing furnace is constructed as a vertical type including said feeding portion and said exhausting portion at an upper section of the furnace and including said takeout portion and said blowout portion at a lower section of the furnace, so that the processing target material can be moved by the deadweight thereof toward the takeout portion, a takeout speed of the carbonized material from the takeout portion being adjustable; and

30 the stirring device comprises a stirring member capable of swiveling about a vertical axis.

[2] The carbonizing apparatus according to claim 1, wherein said carbonizing furnace includes a temperature detecting portion capable of detecting temperature of the processing target material, the blowout amount of the combustion air from the blowout portion being adjustable

according to the temperature of the processing target material detected by said temperature detecting portion.

5 [3] The carbonizing apparatus according to claim 1, wherein
said blowout portion is provided in a peripheral wall of the carbonizing
furnace and in the stirring member, respectively.

10 [4] The carbonizing apparatus according to claim 1, wherein
an inside of the carbonizing furnace located between said feeding portion
and said exhausting portion is formed as a combustion space for unburned
combustion gas.

15 [5] A carbonizing system comprising:
a drying device for a processing target material;
a storage tank for the processing target material;
conveying means for conveying the processing target material
dried by the drying device to the storage tank; and
feeding means capable of feeding the processing target material in
the storage tank to a carbonizing apparatus.

20 [6] The carbonizing system according to claim 5, wherein said
carbonizing apparatus includes:

25 a carbonizing furnace having a feeding portion for a processing
target material, a takeout portion for a carbonized material, a blowout
portion for combustion air and an exhausting portion for combustion
exhaust gas;

a stirring device capable of stirring the processing target material
inside the carbonizing furnace;

30 a blowout amount of the combustion air from the blowout portion
being adjustable;

the system being operable to carbonize the processing target material fed from the feeding portion, with stirring, spontaneously combusting and moving the material while moving this material toward the takeout portion and subsequently to take out the resultant carbonized material from the takeout portion.

[7] The carbonizing system according to claim 6, wherein said carbonizing furnace is constructed as a vertical type including said feeding portion and said exhausting portion at an upper section of the furnace and including said takeout portion and said blowout portion at a lower section of the furnace, so that the processing target material can be moved by the deadweight thereof toward the takeout portion, a takeout speed of the carbonized material from the takeout portion being adjustable; and

the stirring device includes a stirring member capable of swiveling about a vertical axis.

[8] The carbonizing system according to claim 6, wherein said carbonizing furnace includes a temperature detecting portion capable of detecting temperature of the processing target material, the blowout amount of the combustion air from the blowout portion being adjustable according to the temperature of the processing target material detected by said temperature detecting portion.

[9] The carbonizing system according to claim 7, wherein said blowout portion is provided in a peripheral wall of the carbonizing furnace and in the stirring member, respectively.

[10] The carbonizing system according to claim 6, wherein an inside of the carbonizing furnace located between said feeding portion and said exhausting portion is formed as a combustion space for unburned

combustion gas.

[11] The carbonizing system according to claim 6, wherein an exhaust heat recovering boiler is connected to said exhausting portion.

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[12] The carbonizing system according to claim 5, wherein said drying device includes a drying chamber capable of accommodating the processing target material and a drying gas blowout portion capable of blowing out drying gas from under the processing target material inside the 10 drying chamber, thus forming a fluid bed for drying the processing target material under a floating condition, said conveying means being capable of taking out dried processing target material floating inside the drying chamber and conveying this material to the storage tank.

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[13] A carbonizing system including the carbonizing apparatus according to claim 1 and a drying device for the processing target material, wherein said drying device is provided integral with an upper portion of a carbonizing furnace included in the carbonizing apparatus and the system further comprises a drying gas feeding passage capable of 20 feeding combustion exhaust gas of the processing target material inside the carbonizing furnace as drying gas to said drying device.

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[14] The carbonizing system according to claim 13, wherein said drying device includes a drying chamber capable of accommodating the processing target material and a drying gas blowout portion capable of blowing out drying gas from under the processing target material inside the drying chamber, thus forming a fluid bed for drying the processing target material under a floating condition, the system further comprising feeding means capable of taking out dried processing target material floating inside 30 the drying chamber and conveying this material to the feeding portion.

[15] A carbonizing method comprising the steps of:
drying a processing target material by a drying device;
subsequently conveying the dried material to a storage tank for its
5 temporary storage in the tank; and
subsequently feeding the material for its carbonization.